

REMARKS

By the present Amendment, claims 10, 22, 34, 46, 48 and 50 are amended. This leaves claims 10, 14, 16, 18, 20-22, 26, 28, 30, 32-34, 38, 40, 42 and 44-51 pending in the application, with claims 10, 22 and 34 being independent.

Correction of Specification of Claims

The specification and claims 10, 22, 34, 46, 48 and 50 are revised to correct the description of the curvature of the boundary wall in the mold cavities as having the decreased radii of curvature adjacent the mold cavity inner end where head part 16 is formed and as having the increased radii of curvature adjacent the mold cavity outer end where the connection of the stem 17 and substrate 10 is formed. This change conforms to the illustration of Fig. 2 and to the original description of the greater curvature (i.e., the decreased radii of curvature being toward the head part 16) as described in the original specification.

Since these changes to the specification and claims involve a correction and do not affect the rejections raised in the final Office Action, the changes do not raise new issues requiring further search or consideration and should be entered even though submitted after final rejection. Also, these changes place the application in condition for allowance or in better form for appeal.

Rejection Under 35 U.S.C. §112, First Paragraph

Claims 47,49 and 51 stand rejected under 35 U.S.C. §112, first paragraph, on the ground that the specification does not support the beginning at least 1/3 length portion of the curvature length. However, page 7, lines 22-26, describe this curvature beginning at the 1/3 length portion to support these claims.

In view of this description of the 1/3 length portion for this curvature portion in the originally filed application specification, reconsideration and withdrawal of this rejection is requested.

Rejection Under 35 U.S.C. §112, Second Paragraph

All of the pending claims stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite as allegedly being unclear how the same cavity can form different configurations. However, the different configurations are for the end surfaces of the heads which are not formed by the specifically claimed convex path. These end surfaces are conventionally formed by structures at the axially facing, inner end surface of the mold cavities.

In view of this explanation, reconsideration and withdrawal of this rejection is requested.

Rejections under 35 U.S.C. §102 and §103

Each of the presently pending independent claims, claims 10, 22 and 34, recite a process for producing adhesion elements on a substrate. The process comprises steps of introducing thixotropic plastic material of polyvinyl siloxane into mold cavities in at least one shaping element. Each of the mold cavities has a circumferential boundary wall extending in a lengthwise direction thereof continuously along a convex path. Each convex path has a curvature with decreased radii of curvature adjacent an inner end and increased radii of curvature adjacent an outer end. The plastic material is formed into at least 16,000 adhesion elements with flared ends per cm² accomplishing adhesion predominantly by van-der-Waals forces. The flared ends are formed at the inner ends of the mold cavities, with the flared ends forming heads. The adhesion elements have stem parts with ends being formed at the outer ends of the mold cavities

and being opposite the flared ends, with a height from 50 μm to 150 μm and with a diameter from 10 μm to 40 μm . The flared ends have a diameter from 15 μm to 70 μm . Claim 10 further recites that the heads are formed with essentially flat end surfaces. Claim 22 further recites that the heads are formed with slightly convex end surfaces. Claim 34 further recites that the heads are formed with end surfaces having a concavity.

By performing the process in this manner, the adhesion elements are formed so as to adhere to other surfaces as a result predominantly of van-der-Waals forces, not by interlocking with mating adhesion elements in the nature of a hook-and-loop type fastener, also called a "Velcro" fastener. Such predominant adhesion by van-der-Waals forces is achieved without the defibrillation of adhesion stems formed according to a biomedical model based on a geckos foot, and is made possible with the particular plastic material, shape, density and dimensions of the adhesion elements recited in claims 10, 22 and 34.

Claims 10, 16, 18, 22, 28, 30, 34, 40 and 42 stand rejected under 35 U.S.C. §103 as being unpatentable over WO 03/099951 to Arzt in view of WO 2002/013647 to Tuma, with U.S. patent publications 2006/0005362 and U.S. Patent No. 7,198,743 used as translations thereof, respectively. The Arzt patent is cited for the use of polyvinyl siloxane (alleged to be inherently thixotropic) being molded to form adhesion elements with a density of 10^6 to 10^7 per cm^2 , having from 20000 nm to 200 micrometers and a diameter of 20 nanometers to 20 micrometers, having an end of at least 20 micrometers with shaped flared ends and having a contact end angle greater than 70 degrees. The Tuma patent is cited for having a shaping element with convex walls in the shape of a hyperboloid that allegedly would be obvious to use in the Arzt system. Relative to

claims 46-51, the Tuma patent is cited as providing the curvature beginning at a 1/3 length portion.

Claims 20, 32 and 44 stand rejected under 35 U.S.C. §103 as being unpatentable over Arzt publication in view of the Tuma publication when further considered in view of U.S. patent publication No. 2002/020888 to Fearing. The Fearing publication is cited for allegedly teaching optimizing the size, stiffness, adhesive force and packing density of the microstructures. In support of the rejection, it is alleged that it would be obvious to provide the optimized results claimed.

Claims 14, 26 and 38 stand rejected under 35 U.S.C. §103 as being unpatentable over the Arzt and Tuma publications, when further considered in view of U.S. patent publication No. 2005/0072509 to Full. The Full publication is cited for the use of an imprinting roller to achieve the desired mold cavities per cm^2 .

Claims 21, 23 and 45 stand rejected under 35 U.S.C. §103 as being unpatentable over the Arzt and Tuma publications, when further considered in view of U.S. Patent No. 7,018,496 to George. The George patent is cited for thermosetting compositions mixed with thermoplastic compositions and crosslinked to achieve an adhesion element.

The three independent claims are patentably distinguishable over the cited patent documents by (1) the use of thixotropic polyvinyl siloxane to form the adhesion elements, (2) the density of 16,000 elements per cm^2 , (3) the claimed dimensions of the adhesion elements and (4) the shape provided by the different radii of curvature of the mold cavity boundary walls, particularly in combination. Such features are not disclosed or rendered obvious by the cited documents.

Relative to the recitation of “polyvinyl siloxane”, Arzt U.S. publication paragraph 103 is cited. However, this paragraph does not specifically disclose a thixotropic polyvinyl siloxane as claimed.

The claimed curvature shape is not disclosed or rendered obvious by the cited publications. This claimed curvature shape, disclosed in connection with Fig. 2, permits creating small lip head parts necessary to achieve high Van-der-Waals forces for adhesion purposes. This claimed unique combination of shape materials, density and dimensions has been found to be particularly effective for adhesion elements accomplishing adhesion by van-der-Waals forces. Additionally, the claimed features cannot properly be found obvious based on a combination of the cited publications.

Specifically, the cited Tuma publication relates only to an adhesive element having a hook or mushroom head for engagement with a corresponding or mating loop, hook or another mushroom head contacting the underside of the adhesive element. This Tuma publication does not relate to an adhesion element as claimed or as disclosed in the Arzt publication that can engage planar surfaces with the element free end surface by Van der Waals forces. These substantial differences in the problems, structures and operations of the adhesive elements of the cited Tuma publication and the adhesion elements of the Arzt publication demonstrate that one of ordinary skill in the art would not find using the Tuma publication curvature on the Arzt elements obvious to produce the claimed invention.

Claim 10 is additionally distinguishable by the heads being formed with essentially flat end surfaces. The claimed flat end surfaces are particularly effective in producing the adhesion effect by van-der-Waals forces. In contrast, the head part 16 of the Tuma patent, as shown in

Fig. 3 thereof, has end surfaces on the head parts that are convex and that are not as effective as the planar or flat surfaces of claim 10 in producing adhesion by van-der-Waals forces.

Accordingly, claims 10, 22 and 34 are allowable.

Claims 14, 16, 18, 20-21 and 46-47, claims 26, 28, 30, 32-33 and 48-49 and claims 38, 40, 42, 44-45 and 50-51, being dependent upon claims 10, 22 and 34, respectively, are also allowable for the above reasons. Moreover, these dependent claims recite additional features further distinguishing them over the cited patents.

Claims 14, 26 and 38 are further distinguishable by the screen having at least 16,000 mold cavities per cm².

Claims 16, 28 and 40 are further distinguishable by their hyperboloid shape, which is not shown to be obvious in connection with adhesion elements accomplishing adhesion predominately by van-der-Waals production in Fig. 7 of the Arzt publication.

Claims 20, 32 and 44 are further distinguishable by the specific dimensions of the head adhesion elements so as to provide adhesion predominantly by van-der-Waals forces.

Claims 21, 33 and 45 are further distinguishable by crosslinking of the plastic material. Crosslinking of the plastic material for adhesion elements accomplishing adhesion predominately by van-der-Waals forces is not rendered obvious by the George patent since it does not use polyvinyl siloxane.

Claims 47-51 are further distinguishable by the locations of the different curvature portions along the lengths of the mold cavities.

In view of the foregoing, the presently pending claims are allowable. Prompt and favorable action is solicited.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Mark S. Bicks", written over a horizontal line.

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